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BIBLIOGRAPHY.

THE THEORY OF COLOR.

OGDEN A. ROOD. *Modern Chromatics, with Applications to Art and Industry.* With 130 original Illustrations. New York: D. Appleton and Company. 1879. 12mo. pp. viii. and 329. (International Scientific Series.)

PROFESSOR ROOD'S book is interesting to the man of science and to the general reader, but for the artist it has an interest almost unique. The concluding sentences of the Preface account for the special quality that distinguishes it. "I may, perhaps, be allowed to add," he says, "that during the last twenty years I have enjoyed the great privilege of familiar intercourse with artists, and during that period have devoted a good deal of leisure time to the practical study of drawing and painting." The results of this experience appear not only in the practical suggestions which continually come up in course of the discussion, and in the practical and serviceable character of the experiments upon which they are based, but in the way in which the subject is taken up, and the point of view from which it is treated. It is taken up and treated from the artist's point of view.

Nevertheless, like most of the series to which it belongs, the book is well suited to meet the wants of the reader who, without any other purpose than the satisfaction of an intelligent curiosity, desires to obtain clear and consistent ideas upon the modern theory of color, and a knowledge of the newly discovered facts upon which the modern theory is based. That yellow and blue have been deposed from their place as primary colors, and that green and violet reign in their stead, is an announcement sufficiently startling to make even the dullest eager to know on what phenomena it is based, and how the doctrine is reconciled with the daily experience of the painter's studio, which seems every moment to contradict it. Moreover, it would seem that a change so fundamental in the elementary data, must involve a radical, and indeed revolutionary, revision of the doctrines and theories based upon it, and one may well be curious to learn how far the new theory contradicts the old one, and how far either finds its justification in nature.

All this Mr Rood explains in simple and entertaining language, first considering the physical phenomena by which the white light of the sun is made to yield the sen-

sation of color, taking up successively the production of color by dispersion, by interference and polarization, by opalescent media, by fluorescence, and lastly by absorption. Then follow several chapters upon the physiological phenomena through the medium of which these physical conditions affect the nerves which transmit to the brain the impression made upon them. The phenomena of color-blindness, and the phenomena of the mixture of colors and of complementary colors, follow next, with a chapter on contrast, and one upon the classification of colors. At last comes a remarkably sensible chapter on the harmony of color, in which a few quiet sentences suffice to confute and put to flight a host of foolish speculations.

All this, however, has in one shape or another been well enough done before, as the readers of Dr. Lommel's book in this same series, or of the translation of Von Bezold's work upon color, published a few years ago by Messrs. Prang & Co., sufficiently well understand, not to mention the less accessible works of Maxwell, Brücke, and Müller, or of Von Helmholtz, the master of them all. But besides this, the volume in hand embodies results of the author's independent observations and experiments, which add greatly to its value, and give it, in the eyes of the man of science, the interest of an original authority. In some cases these experiments confirm or correct the conclusions reached by previous inquirers who have used the same methods. In others, the methods pursued and the facts developed are alike new. In both cases, the general tendency of the author's labors is towards a quantitative determination of all data. He has, for instance, gauged the comparative intensity of the colors used in his experiments, as well as the area occupied by them, thus measuring all the factors that enter into the result. Many of the chapters have an appendix, in which these experiments and their results are set forth in detail, without encumbering the text.

The whole work, as has been said, is written from the painter's point of view, and it everywhere contains material of strictly technical interest. In discussing the effect upon color of increased or diminished illumination, and of the admixture of white, the pigments commonly used in the arts are severally examined, and in some cases separate tables given for oil-colors and for water-colors. The chapter on contrast, as might be expected, is full of interest to the artist, and those that follow, upon combinations of

colors by twos and threes, upon gradation, or the use of different hues of the same color together, and upon the use of color in painting and decoration, are specially given to the discussion of the problems which the artist has to solve. It is a distinguishing mark of these chapters, that the question of æsthetics, the inquiry what colors look well together and what do not, is discussed in a purely scientific spirit, by means of a careful examination of the facts, without a trace of the *a priori* assumptions with which this question is ordinarily approached. The notion, for instance, that the complementary colors make the most agreeable combinations, is shown not to be in accordance with fact, and this dogma is finally set at rest by the remark, that though these combinations are always, from the nature of things, the most striking and violent, this is not always a desirable quality, the contrast of complementaries being in many cases hard, crude, raw, and disagreeable.

The artist who wishes thoroughly to understand his business, to get to the bottom of the facts and phenomena with which he has to do, can easily, by reading this book, put himself in possession of the latest thought and the most advanced investigations on the subject. If the novelty of the ideas and the unaccustomed atmosphere of scientific thought leave but a confused impression on his mind, a perusal of the volumes of Von Bezold and of Dr. Lommel, neither of which is large or difficult of comprehension, would make everything clear. Though written with a different purpose, they cover much of the same ground, and mutually illustrate each other. Such a study would make many things, which at first acquaintance are strange and queer, seem familiar and natural, and would enable them to take their place in the mind as matters of course,—as part of the common stock of intellectual furniture with which the every-day work of life is to be performed. Until such easy terms come to be established, one's new knowledge lies an undigested mass in his mind. It is the fear of this,—a consciousness that such knowledge as that contained in this book, however entertaining and pertinent to their work, is yet so far out of the ordinary current of their thought as to be practically of little service,—that prevents such books as this from receiving the recognition among artists which they deserve. They are closed books to the only persons whom they can really serve. But it would seem as if a wholesome intellectual life, the result of a generous culture,—a life in which the precision of science would play as natural a part in the artist's consciousness as the finer perceptions and sensibilities,—would not only increase his capacities and enlarge his resources, but would put him more fully into sympathy with his own time. At any rate, the personal education of artists seems deficient in breadth, if they are to feel embarrassed in the presence of such knowledge as this book affords them.

WILLIAM R. WARE.

THE LITERATURE OF THE TANAGRA FIGURINES.

THE interest which in the last few years has been manifested in the Tanagra figurines is of a purely æsthetic character, and extends to but a small number of the objects found in tombs of the Asopos valley. Clay figurines are nothing new. Thousands and thousands of them have been found in other

places, Sicily, Cyprus, Melos, Attica, &c.; but none, until recently, excited any general attention in the artistic world. It was only when, in 1873, chance brought to light from the tombs of Bœotian Tanagra a number of small figures instinct with that living grace which is the buried secret of true Hellenic art, that artists and lovers of art became interested. These figures were felt to be more than archæological specimens, and the few that were known occasioned a loud call for more. In consequence of this, numerous sporadic and ill-conducted excavations were undertaken in the valley of the Asopos by gain-seeking natives, who sold the results mostly to wealthy foreigners, for fabulous prices. It was in these excavations that the finest of the figurines were found. Afterwards, when the attention of the Greek Archæological Society was drawn to the matter, excavations were undertaken in a systematic way, and an enormous number of figures, belonging to widely separate periods, unearthed. Most of these are now in the Varvakion¹ at Athens, and a highly interesting collection they form,—one which will afford much material for study to future archæologists. I say *future*, for as yet the meaning and purpose of these figures have only been guessed at, some archæologists holding that most of them belong to the region of every-day human life, others that they represent mythological personages. For the present, therefore, their archæological value must remain an open question: about the artistic worth of a large number of them there can be no doubt, and it is with this that we have more especially to do.

The literature of the Tanagra figurines is not large. A good many articles on them have, indeed, appeared in various archæological and art periodicals;² heliotypes of those in the Berlin Museum have been published by Wasmuth, and those in Paris are now in process of publication by Léon Heuzey. But the most important works are those of R. Kekulé and E. Curtius.

The former,³ which is merely an instalment of a most comprehensive work on ancient terra-cottas undertaken by the German Imperial Archæological Institute, is one of the most splendid volumes ever issued from the press, doing all that can be done to present the finest of the figurines in their original, bewitching grace. The text gives a summary of what is known regarding the history of Tanagra, a description of its situation, and a brief account of the discovery of the figurines, with some judicious remarks on their date and character. The majority of the illustrations are colored, and it is no exaggeration to say, that among them are the most beautiful female figures that ever met human eye. If any one wishes to understand why Greece was ready to sacrifice everything rather than calmly submit to the abduction of Helen, he has only to look at the

¹ The Varvakion (*Βαρβακείον*) is one of the Athenian public gymnasia, of which a few rooms are used by the Archæological Society as a museum for smaller objects. There is no published catalogue of its contents; but it is perhaps the most valuable collection of the kind in the world.

² E. g. Otto Lüders, *Im Neuen Reich*, 1874, pp. 176 seq.; *Bullettino dell' Istituto*, 1874, pp. 120 seq.; O. Rayet, *Gazette des Beaux Arts*, 1875, 1878 (several articles); Heuzey, *Monuments grecs publiés pour l'Encouragement des Études grecs en France*, 1873, 1874, 1876 (various articles); G. d'Orctet, *Revue Britannique*, October, 1876, &c.

³ *Griechische Thonfiguren aus Tanagra*. Im Auftrag des Kaiserlich deutschen archäologischen Instituts zu Berlin, Rom und Athen, nach Aufnahmen von Ludwig Otto, herausgegeben von Reinhard Kekulé. Stuttgart: Verlag von W. Spemann, 1877, fol., pp. 24, plates 17.